What is Claimed Is:

1. An microfluidic device comprising:

A) a substrate with a top surface comprising a channel, wherein the channel has a width, a bottom and a sidewall; and

B) a cover positioned over the substrate in alignment with the substrate,

wherein the channel is accessed through an access port to the channel, the access port positioned on at least one of the cover and the bottom.

2. The microfluidic device of claim 1 wherein the access port to the channel is an opening on the channel bottom.

3. The microfluidic device of claim 1 wherein the access port to the channel is an opening on the cover.

4. The microfluidic device of claim 1 wherein the channel bottom is coplanar with the top surface of the substrate, and the channel sidewall rises from the substrate surface at an angle between about 45 and 135 degrees, wherein the substrate, and the sidewall are composed of a polymeric material.

5. The microfluidic device of claim 4 wherein the channel sidewall comprises a thin region of the sidewall.

6. The microfluidic device of claim 5 wherein the sidewall comprises a plurality of thinned regions.

7. The microfluidic device of claim 5 wherein a metal is deposited on the thinned region.

8. The microfluidic device of claim 1 wherein the channel bottom is beneath a plane co-planar with the top surface of the substrate.

9. The microfluidic device of claim 1 wherein the device further comprising an alignment device adapted to align the cover with the substrate.

10. The microfluidic device of claim 9 wherein the alignment device is a dowel pin positioned on the substrate.

11. The microfluidic device of claim 9 wherein the alignment device is a protrusion positioned on the cover.

12. The microfluidic device of claim 9 wherein the alignment device is accurate to better than 0.001 inch.

13. The microfluidic device of claim 1, the device further comprising a capillary positioned in the channel access port and inserted in the channel, wherein the access port has a diameter and the capillary has an outer diameter, and wherein the capillary outer diameter and the access port diameter are approximately equal.

14. The microfluidic device of claim 13 wherein an adhesive secures the outer circumference of the capillary to the access port.

15. The microfluidic device of claim 13 wherein the capillary is made of a second polymeric material that is transparent.

16. The microfluidic device of claim 1, the device further comprising a capillary positioned in the channel access port and inserted in the channel, wherein the capillary has an inner cross-sectional area and the channel has a cross-sectional area and the capillary cross-sectional area and the channel cross-sectional area are approximately equal.

17. The microfluidic device of claim 1 wherein the device comprises a first and a second channel, the second channel positioned below the first channel, the first channel has a conduit extending from the bottom of the first channel to the second channel.

18. The microfluidic device of claim 1 wherein the device further comprises a structure selected from the group consisting of a reservoir structure, a detector window region, a microreactor and a distillation column, wherein a capillary connects the channel to the structure.

19. The microfluidic device of claim 1 wherein the substrate comprises a plurality of conical nozzles, the conical nozzles positioned in a geometrical array.

20. The microfluidic device of claim 1 wherein the cover further comprises an interconnecting duct, the duct connects to at least one channel via the access port.

21. The microfluidic device of claim 1 wherein the sidewall comprises an inner surface facing the channel and an outer surface opposite the inner surface; and wherein the cover comprises a bottom surface, the

bottom surface facing the top surface of the substrate; the cover further comprising a protrusion that extends from the bottom surface of the cover; wherein the cover protrusion is adjacent to the inner surface of the sidewall.

22. The microfluidic device of claim 1 wherein the sidewall comprises an inner surface facing the channel and an outer surface opposite the inner surface; and wherein the cover comprises a bottom surface, the bottom surface facing the top surface of the substrate; the cover further comprising a protrusion that extends from the bottom surface of the cover; wherein the cover protrusion is adjacent to the outer surface of the sidewall.

23. The microfluidic device of claim 22 wherein an interstitial region is formed between the top surface of the substrate and the bottom surface of the cover in regions bordering the outer surface of the sidewall.

24. The microfluidic device of claim 1 wherein the channel comprises a channel structure positioned within the channel and oriented perpendicular to the channel sidewall, and perpendicular to the channel bottom.

25. The microfluidic device of claim 1 wherein the channel comprises a first linear section and a second linear section, wherein the first and second linear sections are perpendicular.

26. The microfluidic device of claim 1 wherein the channel bottom has a width of greater than 100μm.

27. The microfluidic device of claim 1 wherein the channel sidewall is between 10 μm and 50 μm in height.

28. The microfluidic device of claim 1 wherein the sidewall and channel bottom are formed from the polymeric material.

29. The microfluidic device of claim 1 wherein the polymeric material is a low melt viscosity polymer.

30. The microfluidic device of claim 29 wherein the polymeric material is selected from the group consisting of polycyclic olefin polyalkane co-polymers, poly methyl methacrylate, polycarbonate, polyalkanes, polystyrenes and polymer blends containing a liquid crystalline polymer as an additive.

31. The microfluidic device of claim 1 wherein the device comprises an additional substrate, the additional substrate comprising a channel architecture, wherein the substrates are bonded together, and further wherein the device comprises a conduit connecting the channel and the channel architecture.

32. A process of making a microfluidic device, the device comprising a substrate and a channel architecture, the method comprising:

A. preparing an injection molding mold, wherein preparing the injection molding mold comprises forming a negative impression of the channel architecture;

B. injecting a polymeric material into the injection molding mold or mold insert, and

C curing the polymeric material.

33. The process of claim 32 wherein the injection molding mold is prepared from a material selected from the group consisting of metal, silicon, ceramic, glass, quartz, sapphire and polymeric material.

34. The process of claim 32 wherein preparing the injection molding mold comprises forming the negative impression of the channel architecture by a technique selected from the group consisting of photolithographic etching, stereolithographic etching, chemical etching, reactive ion etching, laser machining, rapid prototyping, ink-jet printing and electroformation;

35. The process of claim 32 wherein preparing the injection molding mold comprises forming the negative impression of the channel architecture by electroforming metal, and wherein the process further comprises polishing said mold.

36. A microfluidic device comprising a substrate with a top surface comprising a channel, wherein the channel comprises a bottom and a sidewall, said substrate formed by a process comprising:

preparing an injection molding mold, wherein preparing the injection molding mold comprises forming a negative impression of the channel;

injecting a polymeric material into the injection-molding mold;

curing the polymeric material to form the substrate; and

removing the substrate from the injection-molding mold.

37. A microfluidic device comprising:

A) a substrate with a top surface comprising a plurality of non-intersecting channels, wherein each channel has a width, a bottom, and a sidewall; and

B) a cover positioned over the substrate in alignment with the substrate,

wherein each of the channels are accessed through an access port to the channel, the access port positioned on at least one of the cover and the bottom.